A SCADA system implemented with PLC Controllers and LabVIEW

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1. Introduction

Supervisory control and data acquisition (SCADA) is a system of software and hardware elements that allows industrial organizations to:

- Control industrial processes locally or at remote locations
- Monitor, gather, and process real-time data
- Directly interact with devices such as sensors, valves, pumps, motors, and more through human-machine interface (HMI) software
- Record events into a log file

In this work, a SCADA system is developed with the Allen Bradley Micrologix 1100 and a Labview program. The data communication is through the RSLinx OPC server.

2. System structure

OPC is the interoperability standard for the secure and reliable exchange of data in the industrial automation space and in other industries. It is platform independent and ensures the seamless flow of information among devices from multiple vendors.

Allen Bradley RSLinx OPC Server securely communicates over Ethernet, Serial, and "Blue Hose" to many Allen Bradley protocols.

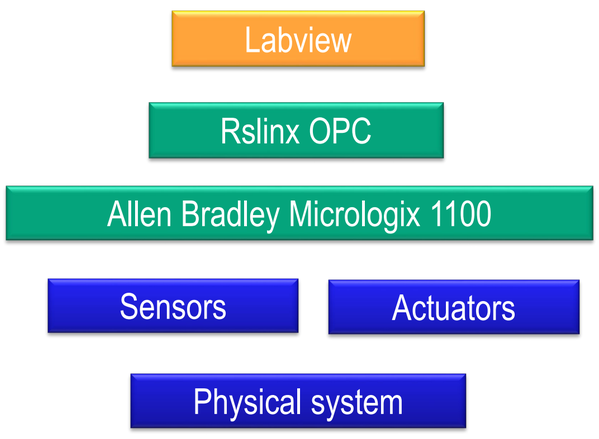


Figure 1 The structure of the system

Fig.1 shows the structure of the SCADA.

- The PLC, Micrologix 1100, controls the physical system through the sensors and actuators.
- Through RsLinx OPC, the Labview program can communicate with the PLC.

Thus, the process control can be conducted and monitored with an user-friendly interface.

3. Hardware and software

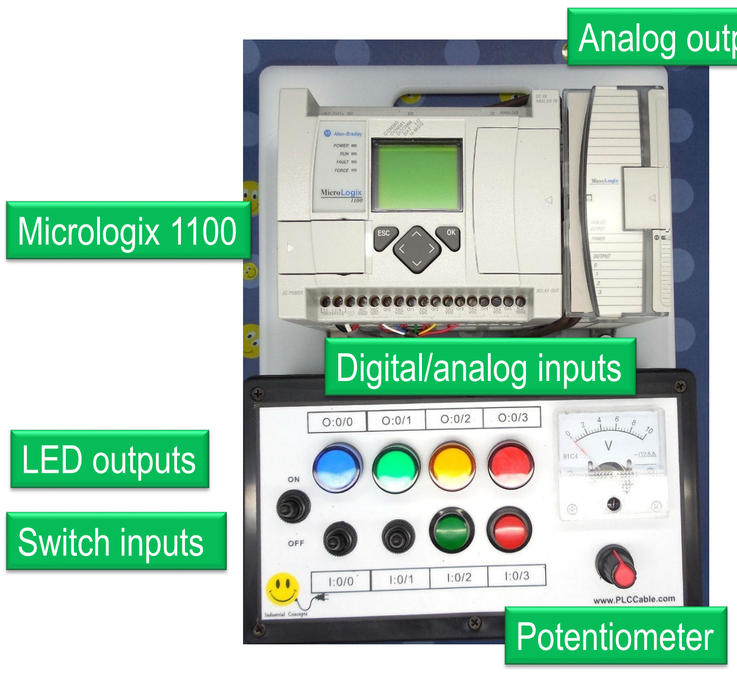
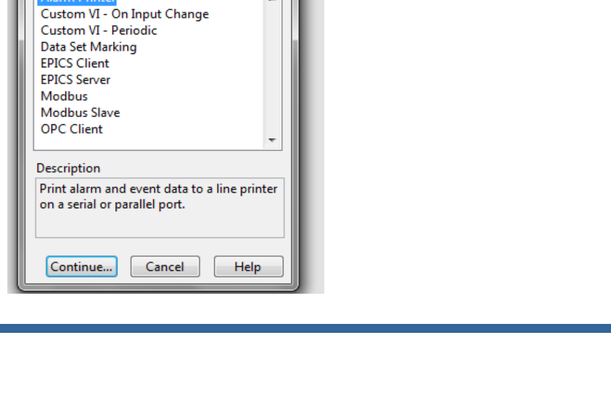


Figure 2 the PLC kit

4. Procedure for setup

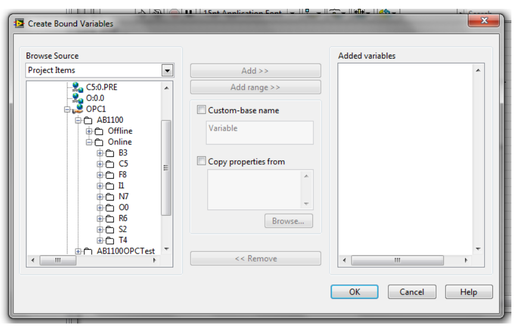
Step 1 use RSLinx to connect the PLC



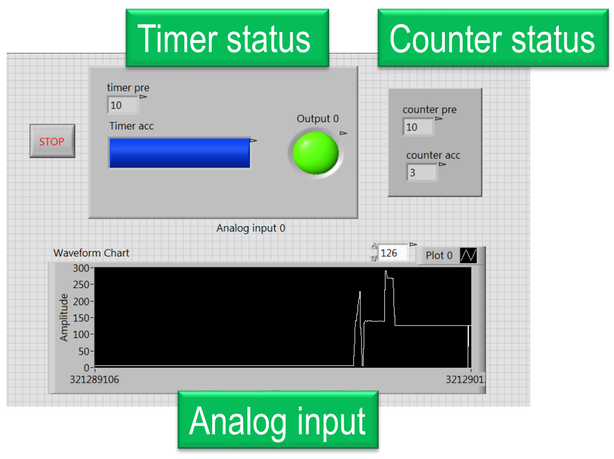
Step 2 develop the ladder diagram

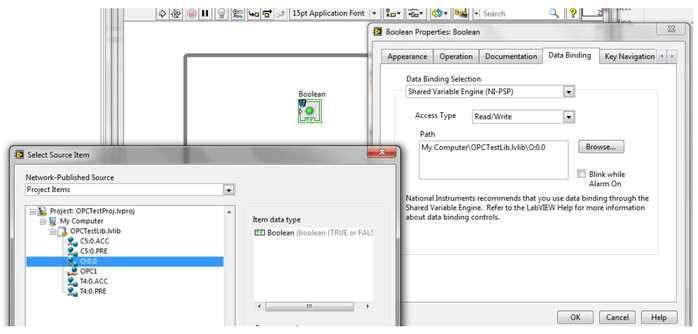
Step 3 create the OPC client in LabVIEW

Step 4 add the variables for the LabVIEW project



Step 5 develop the labVIEW program





5. Experiment results

- The LabVIEW program can communicate with the Micrologix controller.
- The status of the inputs, outputs, timer, and counters can be displayed in the LabVIEW program in numeric indicator or dynamic diagram.

6. Conclusions

The SCADA system is implemented with the LabVIEW and AB Micrologix controller.
The future work includes the remote system and the research on the time delay in the communication.

References

1. Manual of the Micrologix 1100
2. Manual of the LabVIEW
3. Manual of the RSLinx and RSLogix 500 and Micro